Product Explanation
(Specification and User's manual)

Product name

SUNFLOWER TYPE LED SOLAR STREET LAMP

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WARNING !

Carefully read this instruction without fail prior to the usage of this goods and have it in your keeping

1. Construction of Goods

- Please check for the goods being composed of full components as per specification.
- Components: Lighting Fixture, Pole, Control Box, Wiring, Lighting Fixture Arm, Solar Module, Rotary-type fixture, Battery

2. Maintenance & Checking of Work Environment

- Be sure to clear the area where the goods to be installed. When the area is proved to be proper and safe, start the installation work in order.

3. Operating Power Source

- Please use the goods as per the power source specified on the name plate attached to the goods, Otherwise, it may cause damage to the goods or personal injury from electric shock.

4. Switch On/Off (AC type only)

It causes disorder of product or unexpected incidents in case you power up in state of switch being on.

Please check the power on/of switch of the control box; Ensure that the switch lever is off, and then plug in.
(Earth Leakage Breaker: Before plugging in, be sure to check if the earth leakage breaker is installed for the prevention of electric shock)

5. Instruction for Installation Work

Instructions in this user's manual includes important information in the installation and usage of this goods.
If not observing these instructions, it may cause considerable property damage, personal injury, and even death.
You may prevent the accident by strictly observing the basic work instruction and wearing safety equipment considering safety.

Technology Explanation

- **Product name – Sunflower type LED solar street lamp**

- **Model name – DLS10, DLS20, DLS30**

- **Summary of Technology**

  : High-efficient LED solar light system equipped with efficiency of which is increased by 60% or more compared to that of the existing solar panel, using aspherical lens that produce the same intensity of illumination output (Lux) of general 200 watt class metal halogen light or sodium light with 45W power consumption only.

- **Characteristic of the Goods**

  1. **Energy Saving**

  -Using the natural lighting solar energy.
  -Automatic charging power supply system.
  -Lamp is operated for 30 hours when charging approx, 6 hours
  -Structure enabling to maximize the charging efficiency applying automatic tracking sensor for solar location.
  (Solar cell plate automatically rotates by the rotation of low-power DC drive motor.)
  - Contributing to saving of foreign currency that can be spent for energy import.

  2. Easiness of installation/application

  - No separate power supply required.
  (For both AC and Solar use, to be applied)
  - Totally enclosed structure with charging cell and operating controller.
  - Can be installed regardless of place or location.
  - Wire or essential parts required for the existing goods are not necessary.

3. Environmentally-friendliness and Advertisement functions.

- Pleasant light system by using the naturally generated energy (Environmentally-friendliness)
- Energy saving and educational function as the solar energy product (Scientifically educational function as the goods using solar battery.) (Having educational function in terms of the rotation of solar battery panel depending on the solar position)
- Environmentally-friendly technology applied goods that is operated by the naturally-generated energy equipped with exterior illumination-detecting system, having the function of various educational aspects such as automatic operation, etc.

4. Application of Goods.

- School, Park, Pedestrian Road, Roadside, Residential Area, Remote place in mountains, Express Highway Interchange,
- Welfare facility, Residence Hall, Hospital, Condominium, Hotel, Large Building Outdoor Lighting
- Vessel Navigation-use Lighting, Lighting System in Ocean Park, Dangerous Area Indicating Lights at Railroad and Road

Specification & Explanation

▣ Technical specification

Part name	Specification
LED head Lamp	High Brightness LED (Pure White) 864
Light-Emitting Angle View	45 ~ 90(Separately applying by heights)
Power Consumption	45W
Tracker (Rotating Apparatus)	Solar Automatic Tracking (360° Auto-rotary)
Operating Method	Full Auto (Charge/Discharge/Start/Off) system
Rating Voltage	DC 12V
Street lamp Pole	SUS304(OEM Basis)
Illumination (8M)	35~100(Lux)
Solar Module	75w - 1 Unit
Battery	12V 100Ah
No lights days	4 days or longer
Operating Temperature	-40~50℃

※ The above product may be constructed with different specification by Model name.

▣ Standard component specification

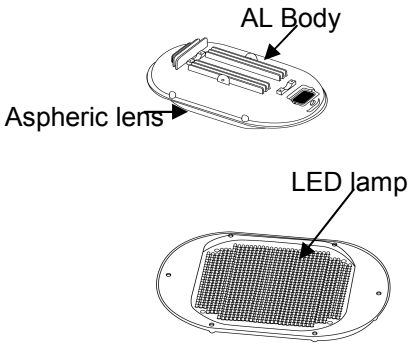
Division	DLS30		DLS20		DLS10	
	Material	Spec	Material	Spec	Material	Spec
Solar cell plate	Solar cell	770-670-15	-	770-670-15	-	-
LED Head Lamp body	Al	435-258-127	Al	435-258-127	Al	435-258-127
Equipment	STEEL	Auto rotary	STEEL	Fixed type	STEEL	-
Street Light Pole	SUS/Steel	Application	SUS/Steel	Application	SUS/Steel	Application
Control Box	SUS	Order made	SUS	Order made	-	Order made

※ Above parts can be made in different color and system as per the request of customers.

▣ Main part specification & explanation

1. LED Head lamp part

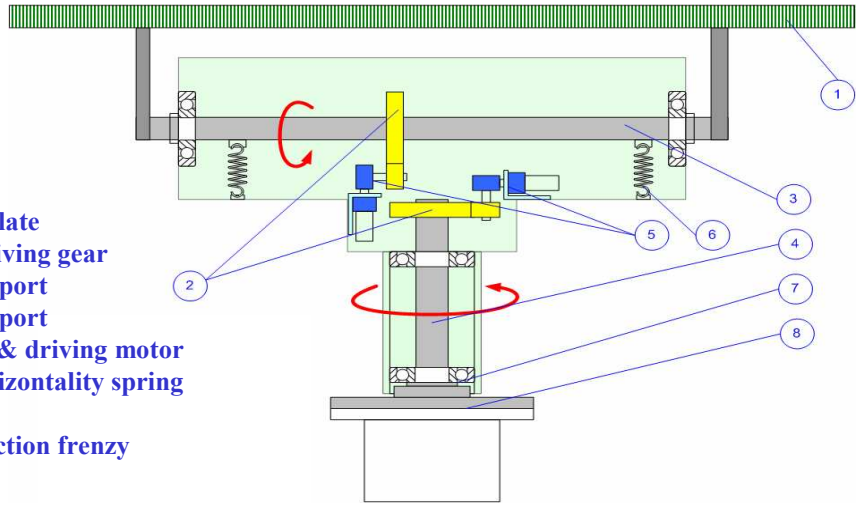
Part name	Angle view	Material & Size	Color	Application Height	Power consumption	Average Illumination
LED lamp	45	Ø5.0 x 9.0mm	Pure White	Over 8M	45W(864pcs)	35 ~ 60
	60	Ø5.0 x 9.0mm	"	Under 6M	45W(864pcs)	60 ~ 100
Lamp Body		Aluminum	Option	Head body can be made according to request of customers.		
Lamp cover		Polycarbo nate	-			

Drawing	Photo
	

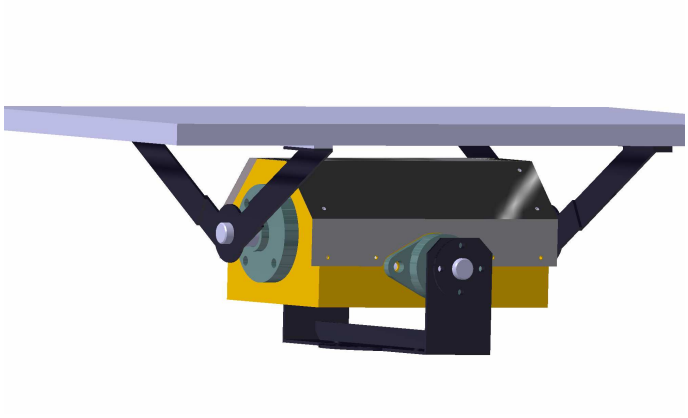
2. Rotating Apparatus (DLS30)

Structure Drawing

① Solar Cell Plate
② Rotation driving gear
③ X – axis support
④ Y – axis support
⑤ Circle gear & driving motor
⑥ Control horizontality spring
⑦ Bearing
⑧ Body connection frenzy

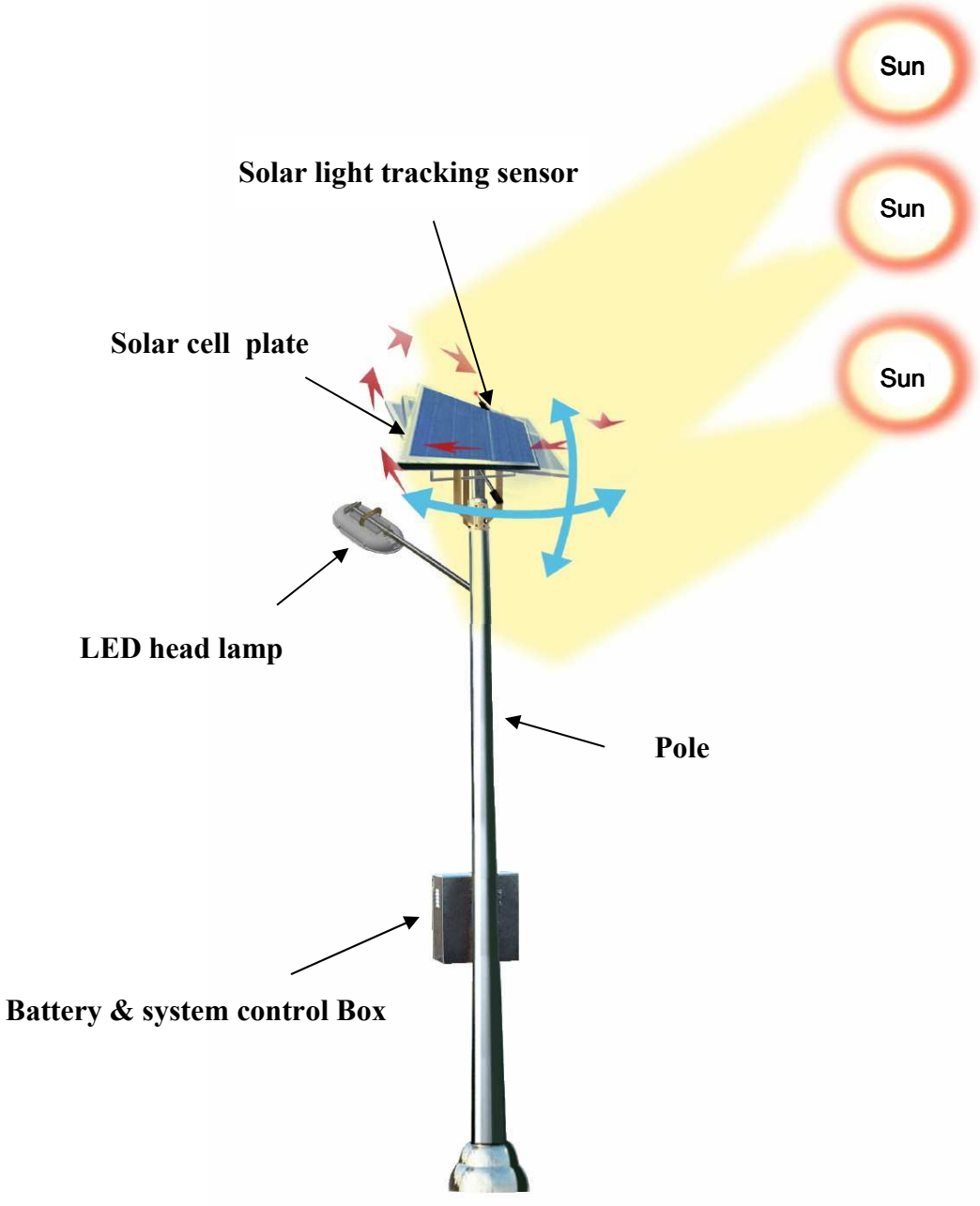


3D Drawing and Photo



3. Product View (DLS30)

Model Name : DLS 30



Comparison Analysis

▣ Comparison Analysis among a variety of street light

Division	general street light Incandescent Lamp	general street light (Metal Halide Lamp)	LED solar street light
Life	5~10 years	5~10 years	semi-permanent
Economy	Largely consuming power and taking a lot of electricity power .	Largely consuming power and taking a lot of electricity power	No cost of electric energy
Maintenance	Taking a lot of maintenance cost because of material aging and frequent exchange of lamp.	Taking a lot of maintenance cost because of material aging and frequent exchange of lamp.	No maintenance cost except the maintenance the battery besides 3~5 years
Environment	Mercury gas, etc. are used. Harmful to environment	Prevent growth of animal/plant with metal discharge	Using naturally generating solar light. Environment-friendliness.
Energy Efficiency	Consuming high electric power, Low energy efficiency	Consuming high electric power, Low energy efficiency	Using natural light source. Separate power is not required. High Efficiency
Installation	Takes time for installation. (Separate electrical wiring and civil engineering work required)	Takes time for installation. (Separate electrical wiring and civil engineering work required)	No wiring work required. Easy installation
Product Cost	Relatively low	Relatively low	Higher than general street light
Power Source	AC110 ~ 220V	AC110 ~220V	DC12V
Lamp Adaptability	Starting after heating filament	Requires time to discharge metal arc -Take long time to start	Instant start
Electrical Safety	No risk of electric shock	Electric shock and explosion accident risks	No risk of electrical accident (using low voltage)
Advantage	▪ Low installation cost ▪ Separate control is not required	▪ Low installation cost	▪ No electricity failure ▪ No additional electricity charge ▪ No risk of electric shock ▪ Semi-permanent life
Disadvantage	▪ Cannot be used when power failed ▪ High maintenance cost ▪ Accident risk	▪ Cannot be used when power failed ▪ High maintenance cost ▪ Accident risk	▪ Additional charging box required

▣ Comparison Analysis by Street light lamp

Division	High Brightness LED Lamp	Tri-Phosphor Lamp	Sodium Lamp
Life	Min. 100,000 hours	9,000 Hours	12,000 Hours
Consumption Power	45W	250W	250W
Ultra Violet/ Thermal infrared	X	O	O
Fire/Explosion Risk	X	O	O
Mercury Content	X	30mg	30mg
Min. Operating Temperature	- 40℃	- 20℃	- 20℃
Lamp Heat	20℃~50℃ (Discharged with Heat Sink)	85℃~120℃ (Insect Pest due to High heat)	300℃~400℃ (Insect Pest due to High heat)
Color Presentation	Soft, Natural Color with Natural Light	Cool and Pale Color	Uniform Color in Single Yellow Tone
Lighting-up Point (Lighting-up Time)	Instant Start/Delayed Start 0.001~0.1 sec. required	1~5 sec. required to start	5~10 minutes required to start
Lamp Light Source	Point Light Source, No ocular spectrum	Surface Light Source. Ocular spectrum and glare problems,	Surface Light Source. Ocular spectrum and glare problems,
Illumination change with voltage fluctuation	Constant-voltage circuit, No Illumination Change	Voltage Fluctuation (Leakage) and Illumination Changes	Voltage Fluctuation (Leakage) and Illumination Changes
Transmittance	Low	High	High
Efficiency	90%	65%	80%
Input Voltage	DC12V	AC110 ~ 220V	AC110 ~220V
Prevention of Electric Shock	DC (Low Voltage), No Risk of Electrocution	Earth Leakage Circuit Breaker	Earth Leakage Circuit Breaker
Advantages	-Long Life -Min. Power Consumption -High Efficiency, Environmentally-friendliness -Min. level of maintenance cost - No electronic wave	Low cost	Low cost
Disadvantage		-Short Life -High power consumption -Frequent maintenance -Interruption of growth of Insect, animal/plant -Electronic wave problem	-Short Life -High power consumption -Frequent maintenance -Interruption of growth of Insect, animal/plant -Electromagnetic waves problem

▣ Comparison Analysis by Street light lamp

Division	Existing tracking type LED Solar Light (90W)	DCX Sunflower Type LED Solar Light (55W)	Comparison
LED Quantity	Power LED 3W approx. 30 pcs	High Brightness LED 864 pcs (3 pcs Parallel and Serial Connection)	LED 3 PCs are connected in parallel and serial, Minimized the consumption current
Consumption Power	3W X 30 = 90W	288 ea X 0.015A = 51.8W	with the bi-axial control system, tracking the solar position that changes by the revolution of earth and solar light that moves by the rotation, having optimum solar light efficiency
Solar light tracking sensor	Uni-axial rotation: Unable to track the solar revolution, but track the one-sided direction of rotation only	Bi-axial rotation: Bi-axial location tracking sensor that exactly tracks the solar position that changes by the revolution of earth and solar light that moves by the rotation	
Illumination (based on 6m)	20~50 Lux	35 ~ 70 Lux	LED light source has the efficiency of at least 30% with aspherical lens used.
Lens Efficiency	Using General Spherical Lens	Optimum Array by aspherical lens; Exterior Light Output is highly efficient with LED lamp used	
Product Unit Price (SUS Pole)	6,500,000 Won / Unit	3,200,000 Won / Unit	Rotary module is imported from Germany, etc. Cost is relatively high because of the rotating device used
Charging Efficiency	DC 12V	DC 12V	Using Charge Battery

DLS30-205 / DLS30-209

DLS30-205

Image of a refined and clean city

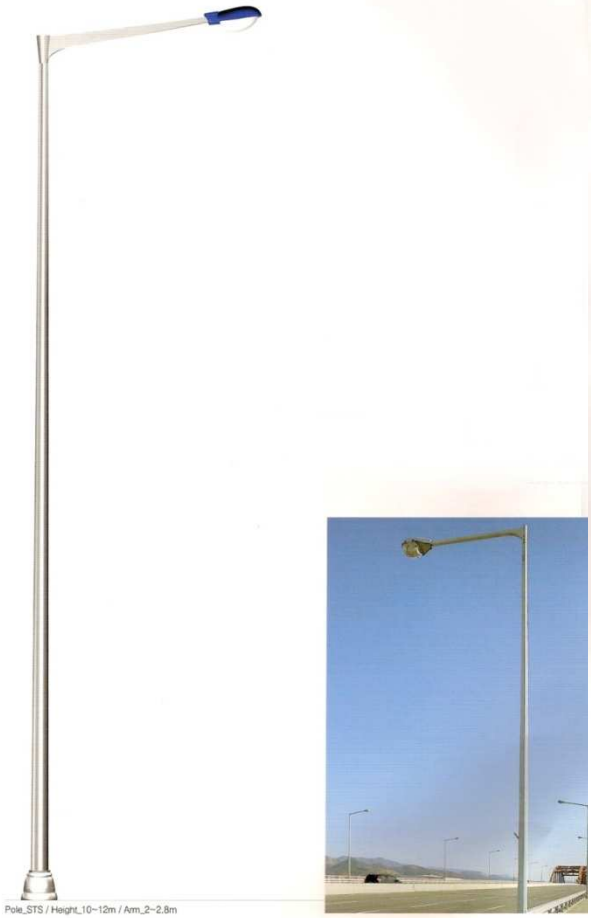
도시형으로 산뜻하고 세련된 이미지 표현

DLS30-209

Friendly feeling from the beach design

해변의 감각을 느낄 수 있는 친화적인 디자인

DNS-104 / DNS-105



DNS-104

Simple design emphasized with a focus on the top finishing of the Pole

단순하면서 상부마감처리에 엑센트를 주어 심플함을 강조

DNS-105

Image of the universe and the change of people are in harmony

우주의 광활함과 인간의 변화무상함을 조화시킴

DNS-107 / DNS-109

DNS-107

Heavy and smooth curve image

주철의 중후함과 부드러운 곡선을 이미지화 함.

DNS-109

Emphasis on the safe structural dynamics of a guardrail's pier of a bridge

교각의 다리 난간 등에 역학적 구조로 안정성을 강조

DNS-110 / DNS-118

DNS-110

Image of an ivory top enclosed with the theme

상아탑을 형상화하여 테파폴에 접목

DNS-118

Use of round lighting of spread shape giving an elegant effect

확산형 원형등기구를 사용하여 단아한 느낌을 줌.

DNS-120 /DNS-202

DNS-120

Stable horizontal level of simple feeling

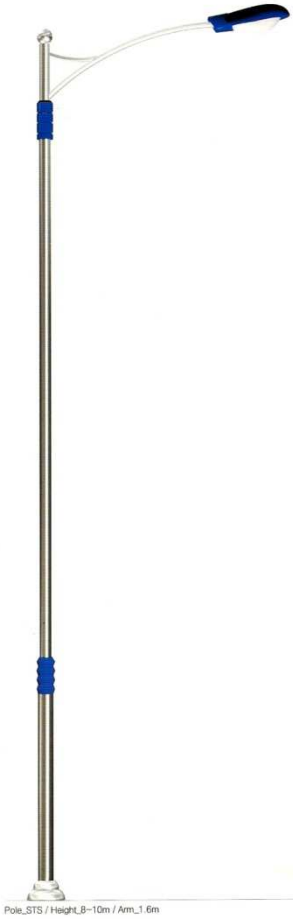
안정적인 수평구도를 사용해 심플한 느낌을 강조

DNS-202

Lighting up of logo will give you effective marketing

로고(마크)를 삽입하여 점등이 가능하여 광고 효과를 볼 수 있음.

DNS-205 / DNS-310



DNS-205

Image of a refined and clean city

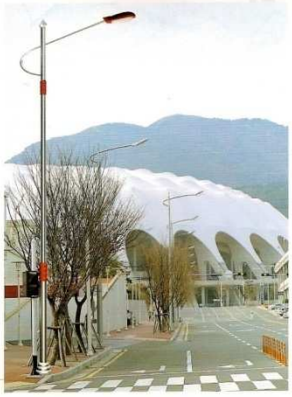
도시형으로 산뜻하고 세련된 이미지 표현

DNS-310

Improved design using a dolphin's image

돌고래를 이미지화하여 부각시킴(해양수산청)

DNS-206 / DNS-207



DNS-206

Image of a yacht used in the design

돗단배를 형상화한 제품

DNS-207

Smoothness of a tree branch

나뭇가지의 부드러운면을 접목

DNS-209 / DNS-211

DNS-209

Friendly feeling from the beach design

해변의 감각을 느낄 수 있는 친화적인 디자인

DNS-211

Figure a Chinese Phoenix design

봉황의 모습을 디자인에 접목

DNS-213 / DNS-215

DNS-213

Image of a flower

꽃의 이미지를 형성화

DNS-215

Design that suits bushwalking in the shape of a seagull

갈매기형으로 산책로에 어울리는 디자인

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